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Release Notes for SAMRAI v2.1.0

(notes for previous releases may be found in /SAMRAI/docs/release)

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NOTE: These release notes are more descriptive and detailed than is usual for software release notes. The reason for this is that presently complete documentation does not exist for most of the items listed. Until sufficient user documentation becomes available, descriptions such as those that follow will be part of SAMRAI release notes.

Please direct any questions related to these notes to the SAMRAI development team by sending email to samrai@llnl.gov.

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Where to report Bugs

If a bug is found in the SAMRAI library, we ask that you kindly report it to us so that we may fix it. We will make every effort to fix bugs in a timely manner. Depending on the severity or the complexity of the bug, we will either fix the bug for a subsequent library release or send a code fix to users so that their work is minimally interrupted.

LLNL users should report bugs using the CASC bug tracking web pages:

http://www-casc.llnl.gov/bugs/

Enter the bug into the appropriate area of the SAMRAI project section.

Bugs found by other users should send email to samrai-bugs@llnl.gov.

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Summary of what's changed

This section contains a summary of changes to SAMRAI. More detailed descriptions of items in the following list are provided below.

(1) The hypre library has changed slightly, affecting SAMRAI's cell-centered Poisson solver codes. Our solvers require hypre-1.9.0b or later.

(2) The "femutils" directory was moved from the solvers package to the algorithms package. Any instances of patch boundary sum objects must be declared in the algs namespace.

(3) Support for time interpolation in communication schedules that treat locally-active patch data has been added. As a result the interfaces and usage of the locally-active patch data communication algorithms and schedules is essentially the same as in the standard case, where patch data lives on all patches in an AMR patch hierarchy.

Summary of what's new

This section contains a summary of additions to SAMRAI. More detailed descriptions of items in the following list are provided below.

(1) New classes added to the multiblock package

(2) Added support for embedded and immersed boundary applications.

(3) Added option to set summary filename in VisItDataWriter.

(4) restart-redistribute tool added to allow for restart on arbirtrary numbers of processors.

Details about what's changed

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(1) Older versions of hypre required that we specify periodic boundary conditions using boolean flags. This interface has been changed, now requiring the periodic shifts instead. The cell-centered Poisson solver in SAMRAI has been changed to conform to this new interface. Unfortunately, it makes our solver incompatible with older versions of hypre. We have tested with hypre-1.9.0b and we recommend that you upgrade to this version if you wish to use hypre.

(2) The "femutils" directory was moved from the solvers package to the algorithms package. Any instances of patch boundary sum objects must be declared in the algs namespace. For example, the reference for PatchBoundaryNodeSum is now in the "algs" rather than "solv" namespace:

OLD: solv::PatchBoundaryNodeSum<NDIM>
NEW: algs::PatchBoundaryNodeSum<NDIM>

Details about what's new

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(1) Some new classes were added to the multiblock package, including MultiblockRefinePatchStrategy and MultiblockCoarsenPatchStrategy. A number of other design changes were also made to more easily support multiblock applications.

(2) Support for embedded and immersed boundary applications was added to the apputils package, in the directory apputils/embedded_boundary. The class EmbeddedBoundaryGeometry manages construction and data manipulation of embedded boundaries on a Cartesian mesh. See header comments for details of the ways in which these classes may be used. We also added links to outside packages - Cart3D and Eleven/Overture - for complex geometry grid generation. These classes are currently empty due to licensing issues, but feel free to send a message to samrai@llnl.gov if you are interested in using them and we may be able to work around the license restrictions.

(3) By default the summary file written by the VisItDataWriter was hardwired to be called "summary.samrai". Some users expressed the desire to change its name so we added a new method VisItDataWriter::setSummaryFilename() that allows the user to change the name of the file. To identify the samrai file to VisIt, the filename must still end in ".samrai" (so the actual filename will be <filename>.samrai, where <filename> is what you supply).

(4) The restart-redistribute tool has been created to allow for restarted runs on an arbitrary number of processors. Ordinarily, SAMRAI's restart files require all restarted runs use the same number of processors as the run that created the restart dump. This tool processes a restart directory and creates a new set of restart files for use on a different number of processors. See the README in the tools/restart directory for instructions on the building and usage of this tool.

Major Bug Fixes

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(1) Problems with communication of "edge" patch data on a periodic domain have been fixed. In particular, this fixes a problem with the patch boundary node sum utilities.

Known Problems

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